SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-40

Name: Scott Lake **County**: Minnehaha
Legal Description: T102-R51-Sec. 7-8
Location from nearest town: 1 mile north, 2 miles west of Hartford, SD

Dates of present survey: July 10-11, 2007
Dates of the last survey: July 12-13, 2005

Primary Game Species	Other Species
Yellow Perch	Black Crappie
Walleye	Black Bullhead
	Northern Pike
	Green Sunfish
	Orange-spotted Sunfish

PHYSICAL DATA

Surface Area: 107 acres **Watershed**: Unknown acres
Maximum depth: 11 feet **Mean depth**: 4 feet
Lake elevation observed during the survey: Full
Date the latest contour map was prepared: 2001 (shoreline map)
Beneficial use classifications: (6) warmwater marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Ownership of Lake and Adjacent Lakeshore Properties

Scott Lake is not listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. Most of the lake lies within a Game Production Area (GPA) owned and managed by the South Dakota Department of Game, Fish, and Parks (GFP), however, the land under the very west end of the lake is privately owned

Fishing Access

Scott Lake has no boat ramp although small boats can be launched from shore on the southwest side. Shore fishing is popular along the road right of way on the south side of the lake. The GFP fisheries crew removed steel rebar and cut brush along the road to improve the area for fishing. Ice fishing is popular on the lake.

Field Observations of Water Quality and Aquatic Vegetation

During the survey this year, the water was very clear with a Secchi depth of 74 cm (29 inches). Sago pondweed (*Potamogeton pectinatus*) beds were common throughout the lake, and cattails (*Typha spp*.) were found in shallow areas along the shoreline.

BIOLOGICAL DATA

Methods:

Scott Lake was sampled on July 10-11, 2007 with three overnight gill-net sets and five overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. Sampling locations are displayed in Figure 5.

Results and Discussion:

Gill Net Catch

Black bullhead (62.3%), walleye (33.0%), yellow perch (3.7%), and black crappie (0.9%) were the only species sampled in the gill nets (Table 1).

Table 1. Total catch from three overnight gill net sets at Scott Lake, Minnehaha County, July 10-11, 2007.

Species	Number	Percent	CPUE[1]	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	134	62.3	44.7	±7.4	74.5	15	3	78
Walleye	71	33.0	23.7	±6.9	15.3	17	1	91
Yellow Perch	8	3.7	2.7	±1.5	45.7	--	--	--
Black Crappie	2	0.9	0.7	±0.4	0.0	--	--	--

*2 years (2003, 2005)

Trap Net Catch

Black bullhead (82.3%), black crappie (11.4%) and walleye (4.3%) were the most common species sampled in the trap nets this year (Table 2). Other species sampled included yellow perch, green sunfish, orange-spotted sunfish, and northern pike.

Table 2. Total catch from five overnight trap net sets at Scott Lake, Minnehaha County, July 10-11, 2007.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	1,002	82.3	200.4	±132.8	111.6	3	0	77
Black Crappie	139	11.4	27.8	±16.6	22.7	22	0	102
Walleye	52	4.3	10.4	±7.9	0.6	4	0	90
Yellow Perch	20	1.6	4.0	±2.0	16.5	63	0	88
Green Sunfish	3	0.2	0.6	±0.5	3.1	--	--	--
O. S. Sunfish	1	0.1	0.2	±0.3	40.5	--	--	--
Northern Pike	1	0.1	0.2	±0.3	0.0	--	--	--

*2 years (2003, 2005)

[1] See Appendix A for definitions of CPUE, PSD, and mean Wr.

Walleye

Management objective: Maintain a walleye population with a gill-net CPUE of at least 15.

Gill-net CPUE and high catch rates suggest high walleye abundance in Scott Lake (Tables 3 and 9). The population is comprised of smaller fish (Figure 1) most likely from the 2005 fingerling and 2007 juvenile stockings (Table 10). The length frequency histogram indicates reasonably good growth with most fish from the 2005 fingerling stocking measuring at least 30 cm or 12 inches in length.

Table 3. Walleye gill-net CPUE, PSD, RSD-P, and mean Wr for Scott Lake, Minnehaha County, 1998-2007.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CPUE						29.0		1.5		23.7
PSD						77		--		17
RSD-P						13		--		1
Mean Wr						92		--		91

Yellow Perch

Management objective: Maintain a yellow perch population with a gill-net CPUE of at least 25.

Yellow perch gill net CPUE dropped substantially in 2007 (Table 4) in spite of adult and juvenile stockings in 2005 and 2006. The creel survey documented a significant increase in perch catch and harvest with over 400 fish harvested prior to the netting survey (Table 8). Additional perch were harvested through the ice. The perch sampled in the gill nets ranged in length from 13-20 cm (5.0-8.0 in) (Figure 2). Scott Lake is scheduled to be stocked with 1,080 adult yellow perch (10 per acre) in 2008.

Table 4. Yellow perch gill-net CPUE, PSD, RSD-P, and mean Wr for Scott Lake, Minnehaha County, 1998-2007.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CPUE						79.3		12.0		2.7
PSD						25		79		--
RSD-P						2		54		--
Mean Wr						97		98		--

Black Crappie

Management objective Maintain a black crappie population with a trap net CPUE of at least 20.

Black crappie abundance increased in 2007 (Table 5) and the fish sampled ranged in length from 4-21 cm (1.6-8.3 in) (Figure 3). Anglers caught over 2,000 (0.35 per hour; Table 8) crappies in 2007 and harvested 1,426 (Table 7) fish with a mean length of 192 mm (7.6 in).

Table 5. Black crappie trap net CPUE, PSD, RSD-P, and mean Wr for Scott Lake, Minnehaha County, 1998-2007.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CPUE						42.2		3.2		27.8
PSD						39		94		22
RSD-P						0		31		0
Mean Wr						108		106		102

Black Bullhead

Management objective: Maintain a black bullhead population with a trap-net CPUE of 100 or less.

Scott Lake has a history of black bullhead problems (Table 6). Bullhead CPUE is still above our objective of 100 and was similar to 2005. The bullheads sampled this year ranged in length from 80-290 mm (3.1-11.4 in) with a mean length of 150 mm (5.9 in) (Figure 4) and anglers harvested over 700 bullheads in 2007 (Table 8).

Table 6. Black bullhead trap net CPUE, PSD, RSD-P, and mean Wr for Scott Lake, Minnehaha County, 1998-2007.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CPUE						10.2		213.0		200.4
PSD						16		16		3
RSD-P						6		0		0
Mean Wr						86		92		77
Mean Length						204		195		150

All Species

CPUE for all species in Scott Lake fluctuate asynchronously (Table 7) in response to water levels, fishing pressure and various other factors.

Table 7. Gill-net (GN) and trap-net (TN) CPUE for all fish species sampled in Scott Lake, Minnehaha County, 1998-2007.

Species	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
WHS (GN)										
WHS (TN)								0.2		
BLB (GN)						71.0		78.0		44.7
BLB (TN)						10.2		213.0		200.4
NOP (GN)						0.3				
NOP (TN)										0.2
GSF (GN)										
GSF (TN)						5.8		0.4		0.6
OSF (GN)						2.7				
OSF (TN)						81.0				0.2
BLC (GN)						6.7				0.7
BLC (TN)						42.2		3.2		27.8
YEP (GN)						79.3		12.0		2.7
YEP (TN)						31.6		1.4		4.0
WAE (GN)						29.0		1.5		23.7
WAE (TN)						1.0		0.2		10.4

WHS (White Sucker), BLB (Black Bullhead), NOP (Northern Pike), GSF (Green Sunfish), OSF (Orange-spotted Sunfish), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye),

Creel Survey Results

Scott Lake was creel surveyed from May through August 2004 -2007 to obtain baseline data on marginal lakes and to serve as a control lake in a study to monitor the effect of the one walleye over 24 inches regulation.

Anglers spent 5,660 hours (53 h/acre) fishing Scott Lake in 2007 (Table 8). From 2004 to 2007, fishing pressure has varied between 6,034 hours or 56 h/acre (2004) and 1,175 hours or 11 h/acre (2006). Low water levels in 2005 and 2006 negatively affected fishing pressure since most of the angling is done from shore and the favorite shore fishing areas turned into shallow mud flats which were nearly impossible to fish. Fishing pressure increased again in 2007 after the lake filled. All of the angling parties interviewed were South Dakota residents.

Table 8. Estimates of fishing pressure and catch (harvest) of fish in Scott Lake from May through August 2004 -2007.

	Fishing Pressure (Hours)	Walleye Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Bullhead Catch (Harvest)	Northern Pike Catch (Harvest)
2004	6,034	3,657 (50)	4,659 (470)	6,454 (2,792)	47 (0)
2005	4,630	163 (156)	66 (66)	496 (206)	163 (85)
2006	1,175	2 (0)	0 (0)	1,235 (156)	0 (0)
2007	5,670	1,880 (908)	1,324 (445)	7,207 (703)	29 (29)

Table 9. Number of angler interviews and estimates of hourly catch rate (harvest rate) of fish in Scott Lake from May through August 2004 -2007.

.	Number of Interviews	Walleye Catch (Harvest)	Yellow Perch Catch (Harvest)	Black Bullhead Catch (Harvest)	Northern Pike Catch (Harvest)
2004	148	0.61 (0.008)	0.77 (0.08)	1.07 (0.46)	0.008 (0)
2005	131	0.035 (0.03)	0.014 (0.014)	0.11 (0.044)	0.035 (0.018)
2006	50	0 (0)	0 (0)	1.05 (0.13)	0 (0)
2007	125	0.33 (0.16)	0.23 (0.08)	1.27 (0.12)	0.005 (0.005)

MANAGEMENT RECOMMENDATIONS

1. Investigate ways to improve boating and shore fishing access.

2. Develop an aquatic habitat improvement plan that includes bullhead management, artificial habitat structures and the restoration of natural aquatic habitat.

3. Conduct lake surveys every other year to monitor the fishery.

4. Stock adult pre-spawn yellow perch in 2008.

Table 10. Stocking record for Scott Lake, Minnehaha County, 1991-2007.

Year	Number	Species	Size
1991	425	Yellow Perch	Adult
1995	800	Yellow Perch	Adult
1997	2,000	Walleye	Fingerling
	133	Walleye	Adult
2000	600	Yellow Perch	Adult
2002	909	Yellow Perch	Adult
2003	10,360	Walleye	Fingerling
2004	259	Northern Pike	Adult
2005	2,200	Yellow Perch	Adult
	4,384	Walleye	Fingerling
2006	1,875	Yellow Perch	Juvenile
	480	Yellow Perch	Adult
2007	331	Walleye	Juvenile

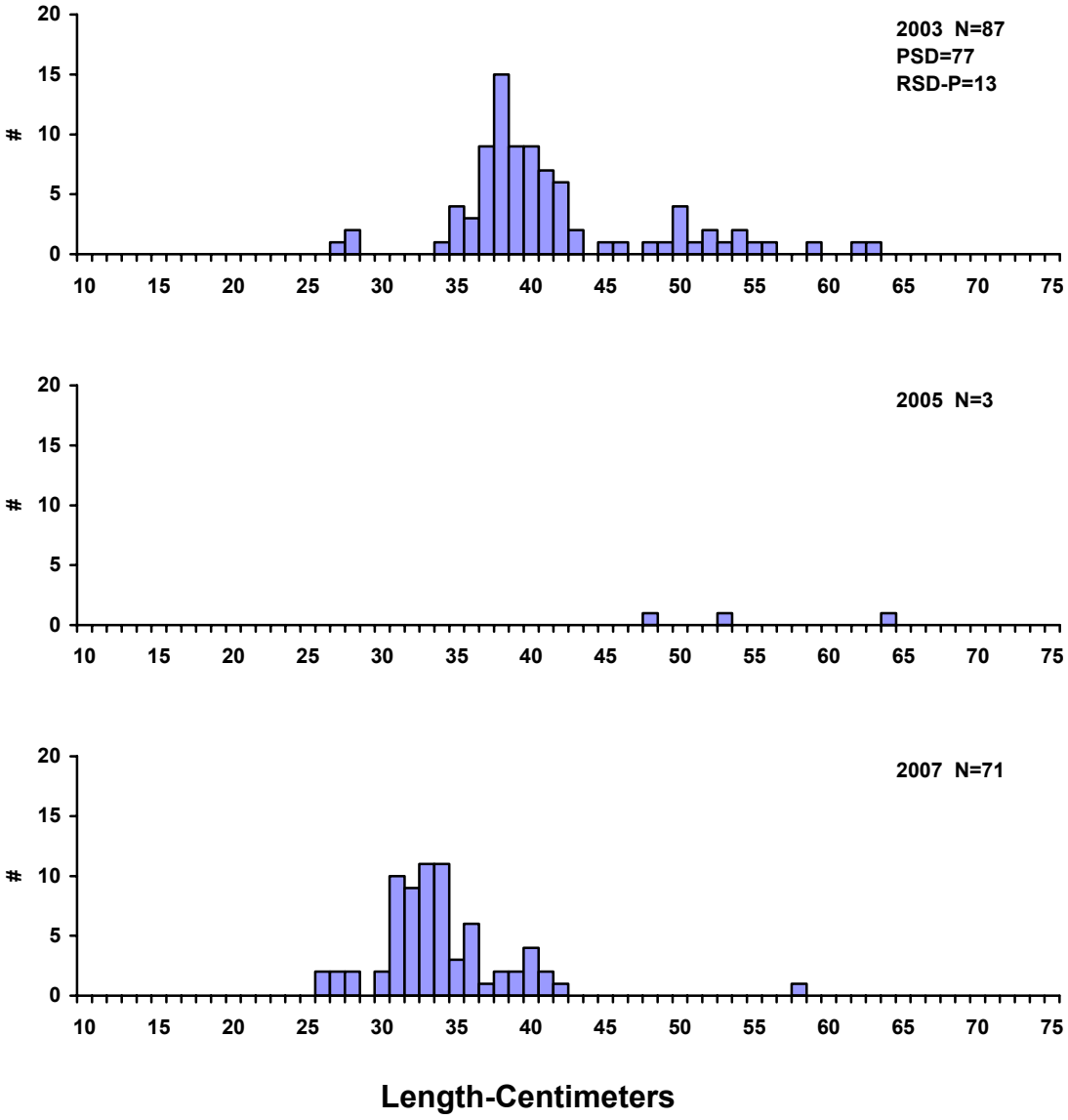


Figure 1. Length frequency histogram for walleye sampled in gill nets from Scott Lake, Minnehaha County, 2003, 2005 and 2007.

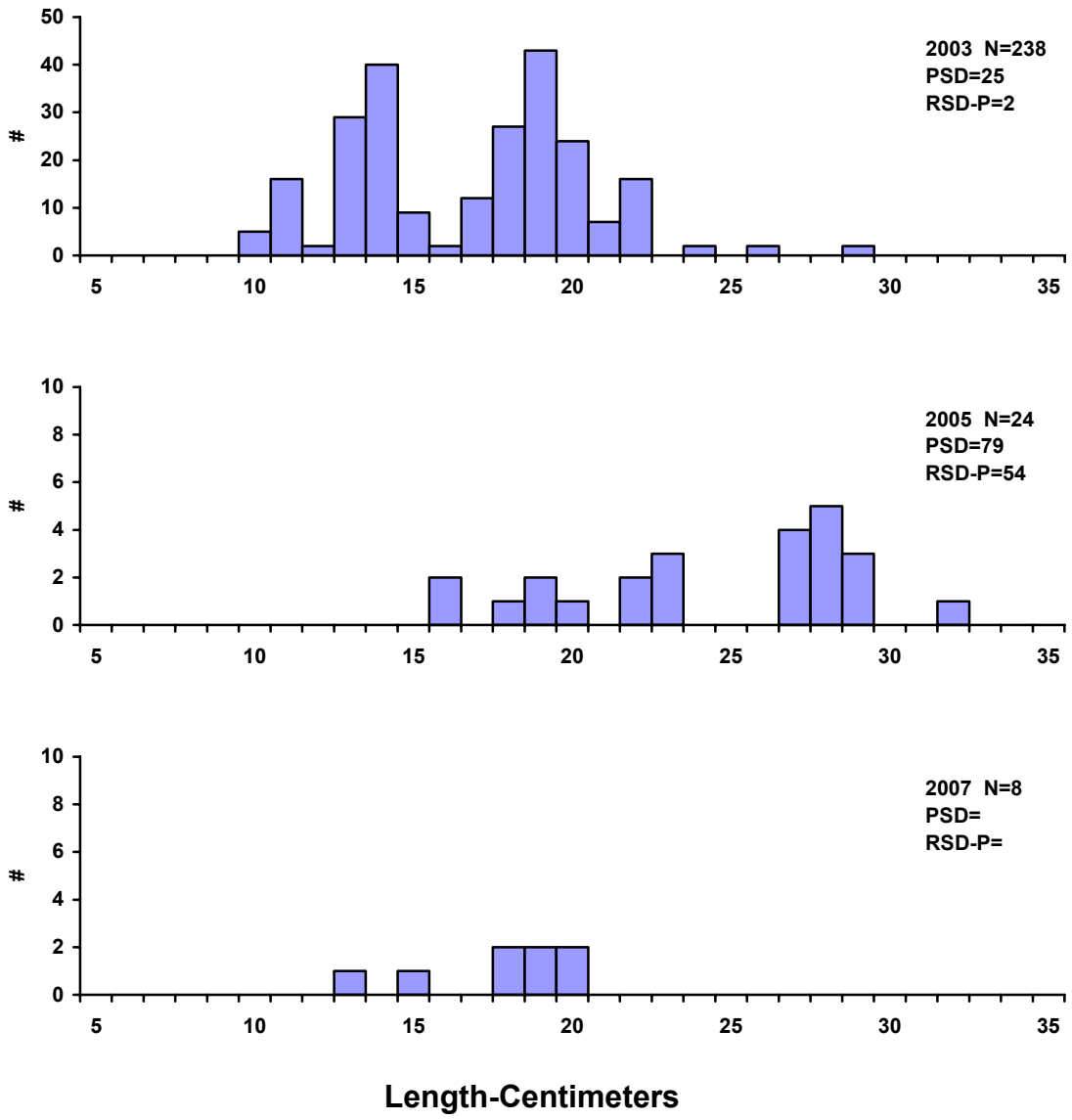


Figure 2. Length frequency histogram for yellow perch sampled in gill nets from Scott Lake, Minnehaha County, 2003, 2005 and 2007.

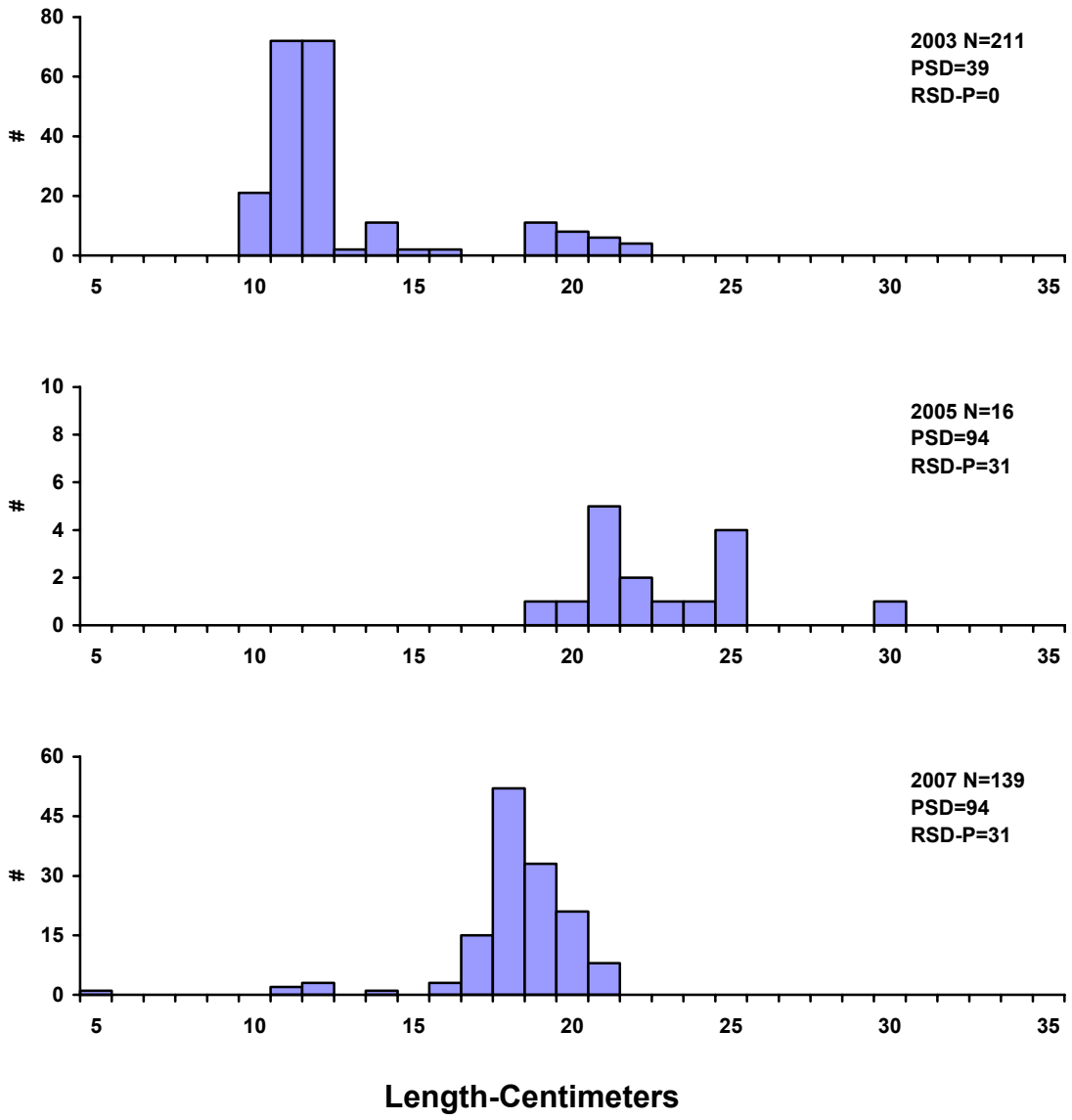


Figure 3. Length frequency histogram for black crappie sampled in trap nets from Scott Lake, Minnehaha County, 2003, 2005 and 2007.

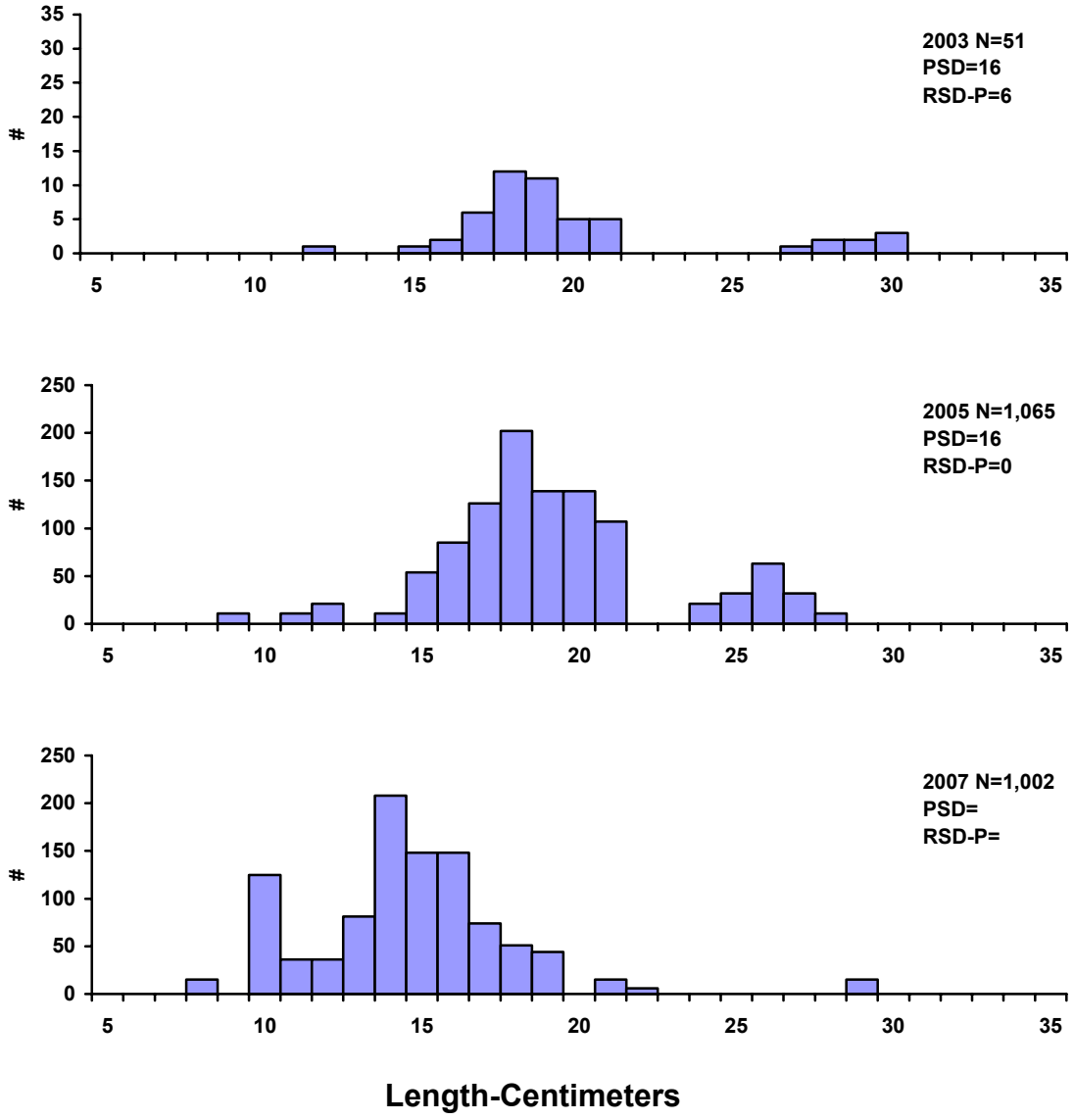
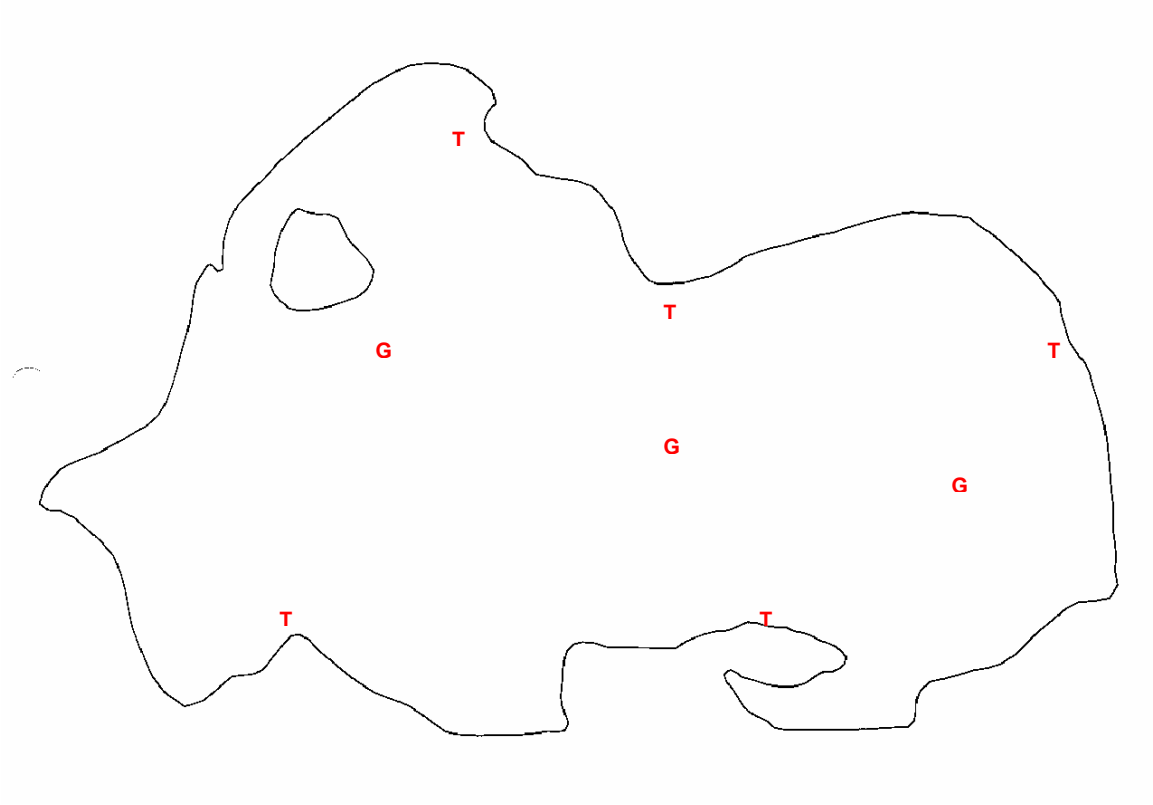


Figure 4. Length frequency histogram for black bullheads sampled in trap nets from Scott Lake, Minnehaha County, 2003, 2005 and 2007.



Legend
Gill Nets: G
Trap Nets: T

Figure 5. Sampling locations on Scott Lake, Minnehaha County, 2007.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.